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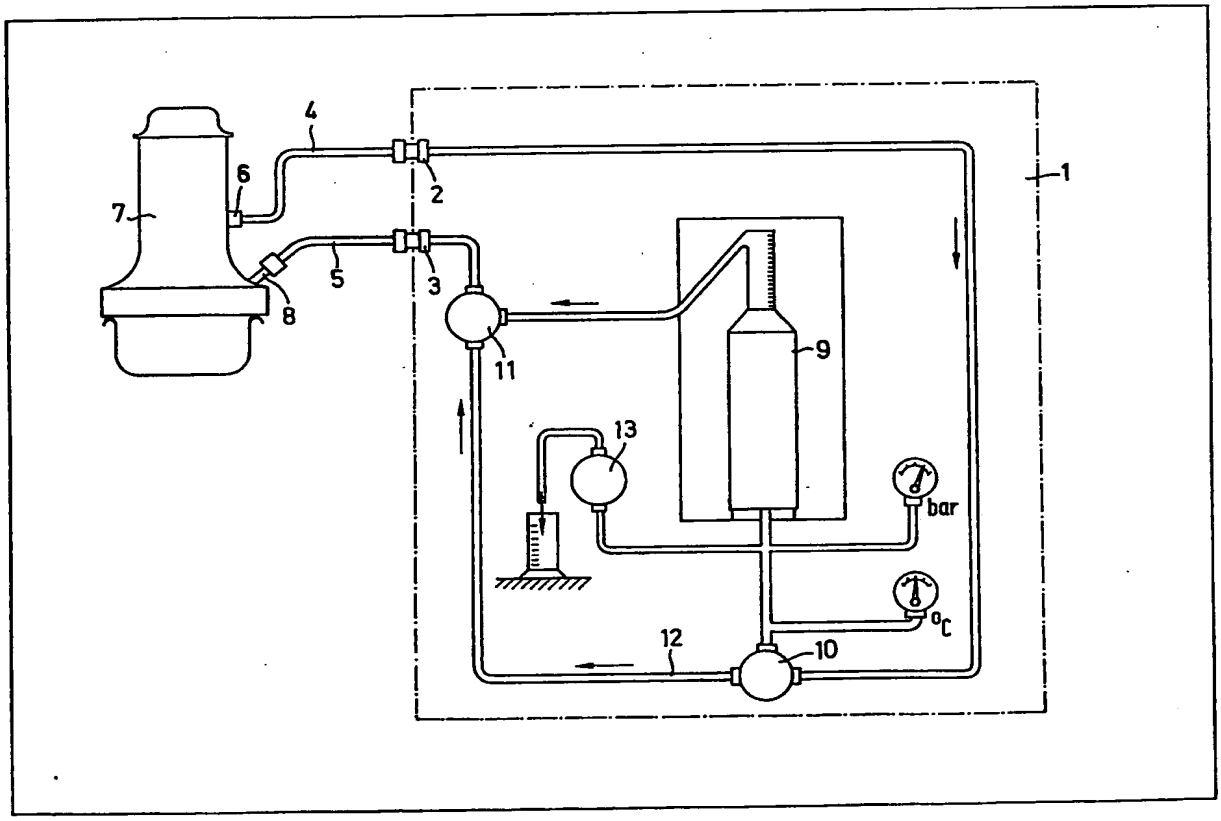
(54) Device for measuring the gas content of liquids

(57) A device for measuring the gas content of a liquid for example lubricating oil from engine 7 comprises a measuring container (9) in which the gas content of the liquid can be read by filling the container with the liquid containing gas, allowing the gas to separate from the liquid in the container and reading the level of the liquid in the container, conduits (4, 5) connected to container (9) to allow the liquid to flow through the container, valve means (10, 11) for isolating the container from the conduits, a bypass passage (12) connected in parallel with the container for permitting the liquid to flow through the conduits when the container is isolated therefrom, and a pressure relief valve (13) for relieving pressure on the liquid in the container.



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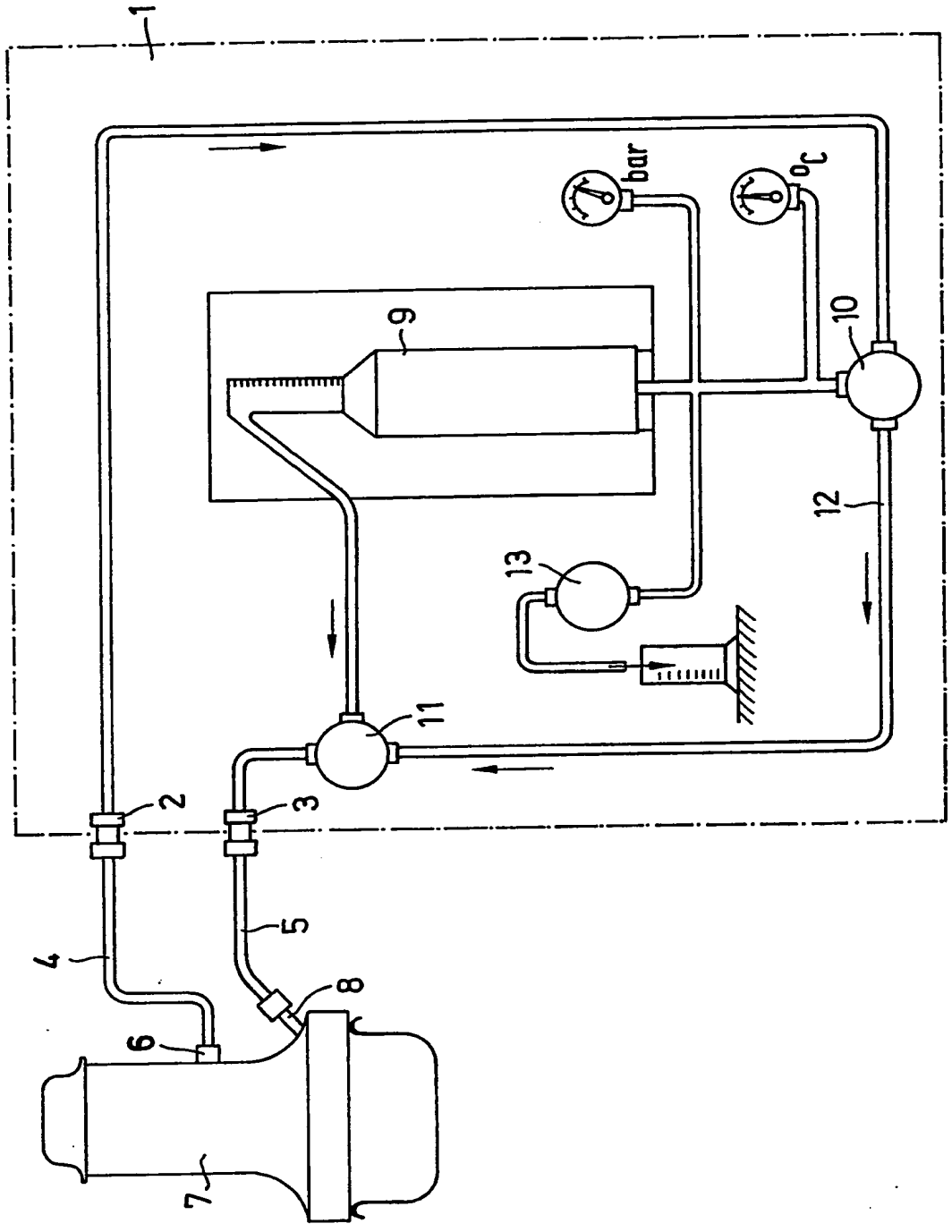

SPECIFICATION

Device for measuring the gas content of liquids

The invention relates to devices for measuring the gas content of liquids.

German International Standard DIN 51 381 describes a technique, known as the Impinger Method, for measuring the gas content of liquids. This technique has the disadvantage that, in order to measure the gas content samples have to be taken from the liquid. The sampling is usually effected by hand and is very expensive and time-consuming. In the case of flowing fluids e.g. in a lubrication circuit of a combustion engine, the values obtained for the air content in motor oil under different operating condition were of hardly any use.

German Patent Publication DE-A-28 40 358 discloses a detecting device which has inductive sensors for measuring discontinuities in flowing fluids, but this kind of device is very expensive and in some cases difficult to manipulate.

According to the invention there is provided a device for measuring the gas content of liquids comprising a measuring container in which the gas content of the liquid can be read by filling the container with the liquid containing gas, allowing the gas to separate from the liquid in the container and reading the level of the liquid in the container, conduits connected to the container to allow the liquid to flow through the container, valve means for isolating the container from the conduits, a bipass passage connected in parallel with the container for permitting the liquid to flow through the conduits when the container is isolated therefrom, and a pressure relief valve for relieving pressure on the liquid in the container.

Since the container is connected in parallel to a bipass conduit, the circulation of the pressurised fluid and can be cut-off for a short time from the circulation via the valve means and then relieved of pressure by means of the pressure relief valve. Instantaneous sampling can therefore be carried out quickly and easily without disturbing circulation of the liquid.

Preferably the measuring container is a transparent graduated cylinder which permits a direct visual reading. Samples can then be taken at the moment most relevant to the test.

The invention is especially suitable for sampling oil in an engine lubricating oil circuit of an internal combustion engine. Instantaneous samples can be taken at a variety of rotational speeds under various operating speeds under various operating conditions of the engine, and even whilst the vehicle is operating, thus enabling the influence of the rotational speed of the engine or the operating conditions on the air content in the engine lubricating oil to be clearly examined.

The invention will now be explained in greater detail with reference to a preferred embodiment thereof which is shown in the accompanying schematic diagram.

In the diagram, a device for measuring the gas content in liquids is marked 1. In the embodiment illustrated this device is a container provided with connections 2 and 3 for the circuit to be monitored. The connections 2 and 3 can be coupled via hose lines 4 and 5 e.g. with a pressure outlet 6 of a lubricating oil system of an internal combustion engine 7 and with a lubricating oil filling hole 8 respectively.

The diagram shows the switching arrangement of a graduated cylinder, pipe lines and solenoid valves in the device 1.

A transparent graduated cylinder 9 is connected via a solenoid valve 10 and a solenoid valve 11 between connections 2 and 3 in such a way that the fluid from the engine can flow constantly through the graduated cylinder 9 but, when the solenoid valves 10 and 11 are operated, is retained in the graduated cylinder 9. At the same time the circulation of the fluid can continue without significant interruption, (i.e. usually with less than a one second interruption) via a bipass line 12. The graduated cylinder 9 is provided with a bottom valve 13 by means of which the fluid retained in the graduated cylinder 9 can be relieved of the circuit pressure.

In this way the gas contained in the fluid can be separated quickly, e.g. in less than thirty seconds, and the corresponding gas content of the fluid can be read off on the graduated cylinder with a 0.1% volumetric accuracy.

CLAIMS

1. A device for measuring the gas content of liquids comprising a measuring container in which the gas content of the liquid can be read by filling the container with the liquid containing gas, allowing the gas to separate from the liquid in the container and reading the level of the liquid in the container, conduits connected to the container to allow the liquid to flow through the container, valve means for isolating the container from the conduits, a bipass passage connected in parallel with the container for permitting the liquid to flow through the conduits when the container is isolated therefrom, and a pressure relief valve for relieving pressure on the liquid in the container.

2. A device according to Claim 1 wherein the container is isolated from the conduits by two three-way valves each connected to the bipass passage.

3. A device according to Claim 1 or Claim 2 wherein the valves are solenoid operated.

4. A device for measuring the gas content of liquids substantially as hereinbefore described, with reference to the drawing.

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